COURSE DESCRIPTION CARD - SYLLABUS

Course name
Basics of statistics [S1BZ1E>PS]

Course

Field of study
Sustainable Building Engineering

Year/Semester
1/2

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Student starting this course has an basic knowledge of probability and statistics, which was acquired in high school in accordance with the current core curriculum. The student has a basic knowledge of mathematics, characterized by logical thinking. The student can operate a computer.

Course objective

Lecture: The aim of the lecture is to present to students theoretical issues in the field of probability and statistics. Student is given the opportunity to use statistical methods to describe experiments. Student acquires knowledge and tools in the field of random variables (discrete and continuous) along with the distributions. Can use descriptive statistics to explain experiments. They acquire knowledge that allows them to make statistical inferences concerning technical issues. Student is able to estimate unknown characteristics and test them. Lab: The aim of the laboratory is to present and familiarize with the theoretical content presented during the lecture in a practical way. The student is able to use specialized computer software to solve and analyze statistical problems. Student uses the R software language to describe technical problems. Student acquires practical knowledge in the field of random variables (discrete and continuous) along with characteristic distributions. Uses a computer for efficient statistical analysis and statistical inference.

Course-related learning outcomes

none

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:
The final grade is determined on the basis of a written test.

Lab
The final grade is determined on the basis of a written test using a computer (RStudio software) and active participation in classes.

Obtaining a minimum of 50% of the points on each of the tests is
tantamount to obtaining a course credit.

Programme content

Lecture (15 hours)
1. Discrete random variable and distributions of discrete random variables.
2. Continuous random variable and distributions of continuous random variables.
3. Descriptive statistics. Measures of position and dispersion, covariance and linear correlation coefficient from the sample.
4. Point estimation. Interval estimation.
5. Hypothesis testing for one population.
6. Hypothesis testing for two populations.
7. Linear regression analysis.

Laboratory (15 hours)
1. Introduction to the R programming language and the RStudio program.
2. Discrete random variable and distributions of discrete random variables.
3. Continuous random variable and distributions of continuous random variables.
4. Descriptive statistics. Measures of position and dispersion, covariance and linear correlation coefficient from the sample.
5. Point estimation. Interval estimation.
6. Hypothesis testing for one population.
7. Hypothesis testing for two populations.

Course topics

1. Discrete random variable: distribution, cumulative distribution function, expected value, variance, standard deviation
2. Continuous random variable: density function, cumulative distribution function, expected value, variance, standard deviation
3. Descriptive statistics: positional and dispersion measures, two-dimensional data and their interpretation
4. Estimation: creating confidence intervals for mean, variance, proportions
5. Testing hypotheses for one and two populations regarding the mean, variance, proportions

Teaching methods

Lecture
The lecture is conducted with the use of a multimedia presentation, along with comments and presentation of examples of tasks related to the considered issue. Lecture conducted with the possibility of active participation of Students with interactive questions. The theory presented in the lectures is consistent with the current knowledge of Students.

Laboratory
Before classes, students receive a list of tasks from a given topic, which are solved in laboratories. The required theory to solve the tasks was presented in lectures and reminded during practical classes. Tasks are solved using a computer and the R programming language with the active participation of Students.

Bibliography

Basic:
1. Krysicki, W., J. Bartos, W. Dyczka, K. Królikowska i M. Wasilewski: Rachunek prawdopodobieństwa i statystyka matematyczna w zadaniach, wydanie 8. PWN Warszawa, 2012
2. Bobrowski, D. i K. Maćkowiak-Łybacka: Wybrane metody wnioskowania statystycznego. Wyd. PP, Poznań, 2004

Additional:
1. Devore, J.L.: Probability and Statistics for Engineering and Sciences, Brooks/Cole, 2012
2. Ross, S.M.: Introductory Statistics, Elsevier, 2010

Breakdown of average student's workload

	Hours	ECTS
Total workload		
Classes requiring direct contact with the teacher		
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)		